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## CLEVELAND ABBE, 1838-1916.

*(Read May 4, 1917.)*

Cleveland Abbe, astronomer, meteorologist, philosopher, for forty-six years an active member of the American Philosophical Society, esteemed and honored by his colleagues in science for his achievements in the fields of meteorology, and the application of that science to the welfare of man, is beloved and mourned by all his friends for the gentle kindliness of his spirit and the unfailing aid, encouragement and inspiration flowing from his inexhaustible stores of information, suggestion and boundless enthusiasm.

More than thirty years ago it was my pleasure to enter upon my official life in Washington as a civil service probationer under the immediate instruction and supervision of Professor Abbe, who was at that time in charge of the so-called Study Room of the Office of the Chief Signal Officer. Although independently, I have nevertheless worked literally side by side in close association with him throughout all the years that have followed our first acquaintance, and to my feelings of esteem and respect for the scholar and devotee have been added my affection, for the man of gentle and generous ways and a spirit refined and purified by his unselfish promotion of the pleasure and welfare of all around him. Embracing the Christian faith at the age of fifteen, the true spirit of Christ moulded and guided his conduct ever thereafter and, although brought up in the Baptist church, in his later years he enjoyed with his second wife the comfort and inspiration of the beautiful ritual of the Episcopal Church.

Cleveland Abbe was born in the city of New York at the home of his parents in Madison Street, December 3, 1838, and died October 28, 1916, at his home in Chevy Chase, Md., after a somewhat protracted affliction of partial paralysis, which though limiting his bodily activity, left his spirit and mental faculties wholly unimpaired to the last. He was the eldest of a family of seven children,

five sons and two daughters, born to George Waldo and Charlotte Colgate Abbe. Three of his brothers and his two sisters still survive him. His ancestry on both sides was of pure English stock of liberty-loving English and Huguenot emigration. His Colonial ancestor, John Abbe, was born in England about 1613 and settled in Salem, Mass., about 1635. Professor Abbe's father was prominent in the mercantile and charitable affairs of New York at a time when public schools were rare and the city was primitive enough for Abbe and his boyhood companions to gather shells on Battery beach. His early education was gained in private schools, later in the David B. Scott Grammar School, No. 40, on 20th Street. From this he entered the New York Free Academy, now the College of the City of New York, in 1851. After making an honorable record in mathematics and the sciences he graduated in 1857, taking, as he says, "the year 1853 over again to my great advantage as a student."

Inspired by his parents with a love of nature, his predilections for scientific pursuits followed naturally, and after graduation his progress toward his life work was rapid and consistent. While teaching mathematics in Trinity Latin School and later in Ann Arbor, Mich., he further perfected his own education in astronomy, spending four years at Cambridge, Mass., in association with Dr. B. A. Gould and assisting in the telegraphic longitude work of the United States Coast and Geodetic Survey. The two years, 1865 and 1866, were spent delightfully at the great Russian observatory at Pulkova, then under the illustrious Otto Struve. Here, under new laws of the autocratic Russian Empire, a few young men of civilian rank, while at liberty to devote their whole time to their own studies, were nevertheless permitted to participate if they so desired in some of the regular work of the observatory, for which a small compensation was allowed. The years of his happy associations and congenial work at this great institution remained thereafter a delightful and vivid memory to him, to which he always referred with sympathy and feeling.

A little incident serves to show the warmth of the hospitality which greeted him and also goes far to explain the mystic charm seeming to surround these impressionable years of his early life. It seems his arrival at Pulkova occurred at about Christmas time.

Imagine his astonishment when he was shown his name on a handsome samovar standing among the gifts beside the Christmas tree. To further prepare him for the astronomical work in which he would be engaged during the long and rigorous winters of northern Russia, arrangements had been made for his advantageous purchase of a splendid great coat lined with native fur. It is easy to understand the deep impression incidents and associations of this kind would make upon the gentle and sympathetic nature of Abbe. Unfortunately the samovar was early stolen from him, but the great coat is still serviceable and among his effects. During the winter of 1909-1910 he resided at the Weather Bureau station at Mount Weather, Va., where the severe atmospheric conditions gave frequent occasions for the use of the great fur coat. The writer, himself, was snow-bound at Mt. Weather on one of these occasions and after the storm, during a nine mile drive through the snow drifts to the railway station, he enjoyed the warmth and protection of the great fur coat, which was even then, after the lapse of about thirty-four years, in perfect preservation, a tribute to the perfected art of tanning furs in Russia.

Returning to the United States Abbe entered upon work at the Naval Observatory at Washington, D. C., in 1867. As early as February in 1868, however, he had accepted the position of director of the Cincinnati Observatory, to which place he removed in June of the same year. A member of Abbe's family relates to me an interesting incident not generally known, concerning his election to the directorship of the Cincinnati Observatory and that well illustrates Abbe's gentle temperament and kindly solicitude for others. During the transatlantic passage on his return from Russia he made the casual acquaintance of an elderly woman of culture and refinement. Ocean travel at that time lacked many of the comforts we are now accustomed to enjoy and during the prolonged passage Abbe found pleasure in telling his sympathetic acquaintance of his hopes and ambitions, and his devotion to astronomy. We can well imagine the frequent opportunities embraced by Abbe to extend his kindly courtesies and contribute to the comfort and welfare of his older companion. The journey ended with the customary partings and exchange of sentiments and sympathies incident to travel and

nothing more was expected to occur. When, however, a year or more thereafter Abbe had moved to Cincinnati, he learned with pleasure and surprise that his selection for the observatory had been suggested and promoted by the flattering representations of his acquaintance of the transatlantic trip. Abbe, it seems, has recited this story chiefly to his own sons, with the admonition that thus they may see the benefits resulting from kindness and courtesies shown to the elderly.

Professor Abbe's wedded life began May 10, 1870, in his marriage to Frances Martha Neal, daughter of David Neal, a resident of Cincinnati. The children of this union were three sons, all born in Washington, D. C., namely: Cleveland Abbe, Jr., born March 25, 1872, married Frieda Dauer; Truman Abbe, born November 1, 1873, married Ethel W. Brown; William Abbe, born June 27, 1877, married Louisa Hart Howson. The mother was a woman of strong character and personality with simple home-loving tastes, opposed to shams, frivolities and ostentations, always hungry for knowledge and intensely proud of her home and children, to whose rearing and education she gave her love and assiduous attention. In this she enjoyed the complete and earnest support of her devoted husband.

At an early period of his life in Washington he purchased an old and historic residence with great rooms and lofty ceilings, located at 2017 I Street, N. W. Here for many years with simple but sincere and hearty hospitality he entertained visiting scientists and others of his acquaintance, always availing himself of such opportunities to increase, if possible, his stores of knowledge by questions and discussions of scientific topics. A frequent visitor to the house in the earlier days when the boys were at home writes in a recent letter: "I have always had a most delightful impression of Prof. Abbe as the head of a family. He was always full of fun and delighted in the pleasure of his children and their friends, or of any guest who came into his house. I never saw him in any mood except one of kindness and cheerfulness. All that I can say is to confirm what all his friends already know—that no man of such learning and such great scientific activities has shown a gentler disposition and kindlier heart than Professor Cleveland Abbe."

The extent of his charities can doubtless never be fully known but the cases of record testify to his disposition to single out deserving and meritorious instances where the bestowal of aid, necessarily limited by his own simple resources, would bear the best fruit. Each of these doubtless meant a definite personal sacrifice, significant of the sincerity and unselfishness of his motives.

The long years of his official life under the government inevitably brought a number of vicissitudes which Abbe's boundless devotion to his beloved science enabled him to bear with patience and toleration; whereas they brought a deeper sadness and resentment to the declining years of his devoted wife. In the early part of 1900 her health began visibly to fail, ending in death in Canton, N. Y., July 24, 1908.

At this date his sons were each married and already established in a home of his own. The father doubtless perceived and felt the loneliness of his situation, in spite of the solicitude and hospitality extended by his sons. Consequently, although then at the age of seventy, it was not surprising to those acquainted with the affectionate and sympathetic spirit of Abbe to learn of his second marriage in Philadelphia, Pa., April 12, 1909, to Miss Margaret Augusta Percival of Basseterre, St. Kitts, British West Indies. In renewed health, after a severe illness following his constant and patient attention to the needs of his first wife in her last illness, Abbe entered upon his new happiness with much of the spirit and romance of youth but, yet, with the sincerity and seriousness of maturity. Each found in the other the great need of all humanity, sacred love, completely satisfied, moulding their separate lives into unselfish reciprocal devotion. There was thus fittingly provided in the tender care and solicitude of this capable wife of a stronger vigor of life than he, both the affection and the attention that were needful when his own bodily strength, which he had so lavishly bestowed in the interests of science and humanity, failed longer to fully sustain him.

The horrors of the European war were a great mental distress to Professor Abbe in his last days and added to the pains his bodily illness brought upon him. His mind, however, was singularly clear

and cheerful even at the last moments, as I am told by those around him.

I have thus dwelt at some length upon events of Abbe's early career and his family life and last days, as heretofore these have been known only to the family and intimate friends, whereas many of his labors in the field of meteorology and his achievements in the interests of the public welfare have frequently been recorded and published. The more notable of these events will now be mentioned briefly in review.

His life and work up to the time he assumed charge of the Cincinnati Observatory must be looked upon as a period of education and preparation. The subsequent years were years of production and harvest. His inaugural address June 30, 1868, at the Cincinnati Observatory presents an outline and program of work in astronomy, meteorology, terrestrial magnetism, surveying and engineering, all characterized by a regard for public welfare that could be accomplished in full only with prolonged labor and resources far beyond those of the observatory itself. This very comprehensiveness, this all inclusiveness of treatment was characteristic of Abbe's view of matters and his method of handling problems he attacked. Among the suggestions in his address was his proposal for the creation of a system of storm warnings and forecasts by means of weather reports collected by electric telegraph. More than a year elapsed before Abbe was able to make a practical demonstration of his plans for forecasting the weather. How well he succeeded in this undertaking is best shown by his own words quoted from his annual report to the Board of Control of the Cincinnati Observatory, June, 1870:

"This subject having been brought, by myself, to the attention of the Chamber of Commerce of this city, that body, in June last (1869), authorized me to organize a system of daily weather reports and storm predictions. Experienced observers at distant points offered their gratuitous coöperation. The Western Union Telegraph Company offered the use of their line at a nominal price. The Bulletin began to be issued September 1, in manuscript form, for the special use of the Chamber of Commerce, and began to be printed a week later as an independent publication.

"This Bulletin was supported for three months, as at first agreed on, by the Chamber of Commerce; its conduct then passed entirely into the hands of the Observatory, and has thus continued until the past month. The inde-

pendent publication of the Bulletin was, however, discontinued, and it has, since December 1, only appeared in the morning papers. The daily compilation of this Bulletin for the newspapers was undertaken two weeks ago by the Cincinnati Office of the Western Union Telegraph Company, and will so continue, thus relieving the Observatory of all further responsibility.

"In February the manager of the Cincinnati office undertook the publication of a daily weather chart, and the favor that this has met with insures its continuation in the future. The Daily Weather Bulletin and Chart are, therefore, now supported solely by the Western Union Telegraph Company, and must be considered as a very important contribution to meteorology. It would have been highly to the credit of the Observatory could these publications have been maintained in its own name; but this was impossible owing to the want of funds and assistants."

Writing of this matter to his father in New York, he said prophetically "I have started that which the country will not willingly let die."

Other forces and influences were also at work to perpetuate and nurture this embryo Weather Bureau for the benefit of the nation. The Executive Documents and the Congressional Globe of the 41st Congress, 2d session, show that on December 14, 1869, Hon. Halbert E. Paine, Member of Congress from Wisconsin, introduced a bill to create a weather warning service under the Secretary of War. The Document accompanying this bill consisted of a Memorial of Prof. Increase A. Lapham of Milwaukee, Wis., entitled "Disasters on the Lakes," and comprised a record of the marine disasters on the Lakes for 1869. The legislation finally enacted was the passage of a Joint Resolution, also introduced by Mr. Paine, which passed the House of Representatives February 2, 1870; the Senate on February 4, 1870; and was signed and approved by the President February 9, 1870. We may therefore conclude that the passage of the legislation establishing meteorological observations and reports in the United States was accomplished chiefly by the Hon. Halbert E. Paine upon the representations of Prof. I. A. Lapham.

No one has been more scrupulously careful than Abbe himself, as can be shown by documentary evidence, to give Professor Lapham the fullest measure of credit for the work done by him which practically ended with the enactment of the law which imposed upon the Secretary of War the task of organizing meteorological observa-



tions throughout the United States and the giving of notice on the northern Lakes and sea-board of the approach of storms.

When the Secretary of War sought to put these provisions of law into operation he endeavored to enlist the services and council of Lapham, Abbe, and others. Lapham declined but Abbe, whose work began with his Cincinnati Weather Bulletin, responded heartily and was appointed the assistant or meteorologist of General Albert J. Myer, chief signal officer of the Army, in charge of this work.

The following quotations from the *Popular Science Monthly* for January, 1888, cite important features of Abbe's subsequent service while the Weather Bureau was under the War Department:

"In this position, Professor Abbe, during 1871, organized the methods and work of the so-called 'probability' or study-room, in making weather maps, drawing isobars, ordering storm signals, etc., and dictated the published official tri-daily synopses and 'probabilities' of the weather. In the same year he began and urged the collection of lines of leveling, and in 1872, by laborious analysis, deduced the altitudes of the Signal-Service barometers above sea level. He instituted in 1872, and reorganized in 1874, the work of publishing a monthly weather review, with its maps and studies of storms. He urged the extension of simultaneous observations throughout the world, as the only proper method of studying the weather; and, as General Myer distinctly avowed, the success of the negotiations of the Vienna Congress of 1874 was due to following his advice. And he organized, in 1875, the work of preparing the material and publishing the 'Daily Bulletin of Simultaneous International Meteorological Observations.' Especially is the organization of the numerous state weather services of the country due to his advocacy, and to the letters sent by his advice by General Hazen to the governors of the states."

"As chairman of the standard time committee of the American Meteorological Society, and later delegate of the United States to the International Meridian and Time Conference, which met at Washington in October, 1884, Abbe took an active part in all those conferences, discussions and studies, which culminated in the adoption by the railroads of the United States of the present system of standard times.

"Professor Abbe's unselfish devotion to the pursuit of science for its advancement and not for his own has prevented his name from appearing as prominently in connection with the work of the Weather Bureau as it deserved to do; but there is a general concurrence of testimony that he has been its guiding spirit. . . . He kept well read up on all meteorological matters, and had a very high appreciation of much that he read; and, when this was the case, he was always very desirous of bringing the matter and the author into notice by means of translations and republications. In fact, he seemed to me to be more desirous of bringing the works and the claims of others into notice than his own. His notes on meteorological subjects, pub-

lished in the Smithsonian Reports, sprung from his extensive reading and desire to communicate to the public whatever he found of value in the course of his reading. . . . When General Hazen was put at the head of the service and a more liberal policy toward civilians, and in the encouragement of scientific work, was adopted, he seemed to wish that all the leading meteorologists of the country could have a part in what he considered the great work of the country, and he especially interested himself in endeavoring to give a chance to promising young men of the country to have a part in this work. In pursuance of this idea he secured the appointment of the eminent physicist, Professor T. C. Mendenhall, and certain steps were taken toward the organization of an experimental laboratory in atmospheric. The beginning was necessarily a very modest one, although the plan of a great experimental laboratory was one that Professor Abbe cherished for many years and let no opportunity escape of urging it upon federal officials and university faculties. At that date (1885-86) the attitude of departmental officials, not to mention members of Congressional committees, was perhaps lukewarm, if not antagonistic to what seemed to be investigations in pure science, and it is not surprising that in this unfavorable atmosphere the project of a physical laboratory flourished only very feebly, and in fact terminated with Professor Mendenhall's election to the presidency of Rose Polytechnic Institute, Terre Haute, Ind.

“For the good work done by the United States Weather Service, and for the high estimation in which it has been held by Europeans generally, the country is indebted to Professor Abbe more than to any other one man. . . . On all important questions touching the scientific work of the service, his advice has been sought by the chief signal officer; most plans for its improvement and extension have originated with him, and he has done much to stimulate the study of meteorology outside of the service as well as within it.

“We are informed by Mrs. Hazen, widow of the late chief of the Signal Office, that Professor Abbe was always held in high esteem by her husband, ‘and relied on not only as a very scientific man but as a loyal friend.’ This sentence brings out another salient trait in his character—his loyalty to his chief. Readers of the *Monthly* will recollect the tribute which he improved the first opportunity after General's Hazen's death to pay to his character and the worth of his work for science; but they do not know, for that is matter of personal confidence, that he was extremely anxious that General Hazen should receive full credit for all that he did, all that he helped to do, and all that he was in any way the means of having done for science; and particularly that he should be vindicated from the unfriendly criticisms which the newspapers had cast against him—all of which Professor Abbe believed to be unjust and unfounded.”

General A. W. Greely, chief signal officer in command of the signal corps at the time the civilian duties thereof comprising the Weather Bureau were segregated and transferred to the Depart-

ment of Agriculture, published in *Science* (Nov. 17, 1916) a fitting tribute to Professor Abbe from which we may quote as follows:

"During twenty years of his service I was intimately associated with Abbe as his subordinate and pupil, as a co-worker, and as his administrative chief. During this term of years there inevitably developed situations which were complex, annoying and embarrassing to the scientific force. Yet in all such conditions I never knew him to display bad temper, to unduly prolong discussions, to advance personal interests, nor to abate his most strenuous efforts to carry out such policies as were judged needful for the good of the service—even though they had not originally met with his approval."

In August, 1893, Professor Abbe was made the responsible editor of the *Monthly Weather Review*, a work he found most congenial. Editorial comments, annotations and original articles therein contribute much of value to the publication and constitute a lasting monument to his fame.

It is quite impossible, in this brief memoir, even to indicate the number, scope and character of his literary works. The list is a very long one and includes a wide range of scientific subjects. His enthusiasm led him to undertake many tasks which the inevitable lack of strength and opportunity prevented him from bringing to completion. Notably among these must be mentioned a study of clouds and atmospheric motions observed by him with a special marine nephoscope of his own invention while on a trip to the west coast of Africa to witness the solar eclipse of 1889. Similarly the scientific papers presented at the International Meteorological Congress, held in Chicago in August, 1893, were only partly published for lack of funds, to Abbe's lasting regret, and he never ceased to urge the fulfillment of the obligation upon American meteorologists to complete this work.

However the genealogy of the Abbe family, the preparation of which received his most feeling and sympathetic attention for many years, and which was so dear to his heart, fortunately was submitted to the publishers in the very last months of his long life.

The scientific societies in which he held membership would also make up another long list. During the active portion of his life he accumulated a very large library dealing with meteorology and related sciences, the care of which in the later years of his life became so great a responsibility that with commendable foresight for the

preservation of such an invaluable collection he arranged to make it an integral part of the library of Johns Hopkins University under the designation of "The Abbe Meteorological Library."

The eminence he never sought for himself has been bountifully bestowed upon him by others. The University of Michigan, in 1886, conferred upon him the degree of LL.D., and in 1896 he received the same degree from the University of Glasgow, the presentation being made by Lord Kelvin, by whose wish Lady Kelvin herself made the Doctor's hood bestowed on that occasion. Naturally his modest nature was profoundly touched by this tribute, and this symbol of his achievements was worn to his grave. He was awarded the medal of the Royal Meteorological Society of England in 1912 and in the spring of 1916 the National Academy of Sciences, of which he was long an active member, awarded him the Marcellus Hartly Medal "for eminence in the application of science to the public welfare." Coming, as this award did, from those he counted as his most intimate friends and associates in scientific endeavor and at a time when he recognized that his strength and force were almost spent, it bore the welcome message: "Well done thou good and faithful servant," and within the year he entered into the joy of his Master's presence.

CHARLES FREDERICK MARVIN.

WASHINGTON, D. C.,  
March 24, 1917.